7 The appearance of dimensional boundary chords and their subsequent evolution

7.1 Lattice separation

The formation of a secondary condensate from eight-dimensional membrane material would in this model, lead to the formation of dimensional boundary chords that would form at each *tri-planar coordinate* within the resultant tetrakaidecahedral lattice. This material would be the product of a *three-dimensional* process, as strings formed into chords (a collection of strings), from three adjacent membrane surfaces (see again *Figures 5.3.01* and *5.4.01* in Chapter Five). This would necessitate an eventual drop to a 3D dimensional energy level after what in this model, has been dubbed the *big-snap*.

This event would itself, be the result of an episode of stretching as the lattice (and the net-like structure of boundary chords within), continued expanding because of the inherited scale factor first seen in the fourth-dimension (from which this lattice evolved). This expansion would continue after the condensation of the dimensional boundary chords and would carry them along with it until this tensile stretching reached its maximum. The chords from which this lattice was now constructed would be made from 'finite' three-component material (3D matter if you like) and a stage would be reached when these could be stretched no further.

Something happened at this crucial moment in cosmic history and this chapter will try to deal with what may have been the process of separation as the dimensional boundary chords became violently detached from their parent 8D lattice. It will be argued that it was this and the very nature of the tetrakaidecahedral lattice itself, that determined not only why dimensional boundary chords and whole teddies alike were able to fall to what was to become our own 3D part of the universe, but that the resulting ratio of separate dimensional boundary chords and whole surviving tetrakaidecahedra, was also pre-determined by the original configuration of the 8D lattice in the first place.

Once established in what was to become three-dimensional space (complete with its component of 4D expansion), ***teddies*** (fourteen sided polyhedrons, or tetrakaidecahedra made-up from the equivalent of thirty-six boundary chords) *AND* ***independent dimensional boundary chords***; would undergo their own evolutionary processes based on characteristics instilled in them prior to what can be called the *big-ping*; as they dropped from the eighth-dimension to form their own (3D) world. They would now find their place between what had been the two-dimensional energy level of membranes or loops, (which resulted from single-dimensional string-to-string contact) and the expansional fourth-dimension, with its integral component of scale. Boundary chords would find themselves isolated from - while at the same time, buoyed-up in, a supporting, expanding and enveloping four-dimensional universe – and while its overall volume would have been tiny by comparison to the currently believed size of our host today, this four-dimensional plane would still be undergoing this process of expansion.

In a small, but energetic cosmos, not long after the big-ping, collisions between teddies would be frequent and commonplace and it would be these events, especially teddy-to-teddy contact or collision, that would act as a further catalyst in the evolutionary process that must have eventually resulted in the observable universe we witness around us today. The teddies and independent boundary chords would be responsible for *ALL* the baryonic and fermionic material we witness today - and much more besides. Returning to this period of stretching within the 8D lattice, such an event would not be able to continue indefinitely - and eventually, something would have to give. The way in which this occurred, would have dictated many of the characteristics we observe around us in this, our own part of a multi-dimensional cosmos. This stretching, could force this tetrakaidecahedral mesh (and the boundary chords within), to increase in size by perhaps more than four orders of magnitude before the inevitable *big-snap*. The reason for this choice will become apparent later, but has everything to do with the observed difference between the average size of the electron shell and that of the nucleus. When this 'snap' does occur, boundary chords and complete or whole tetrakaidecahedra (teddies) will become detached, as their previously inter-connected mesh breaks down.

The nature of the tetrakaidecahedron is such, that there is the possibility of a direct relationship between the ratio of resultant (3D) independent boundary chords *(IBCs)*, to whole surviving teddies *(WSTs)*; because of the way that these bodies are able to 'stack' together (with absolutely no free space between them). In a tetrakaidecahedral-type lattice such as that described here, each and every teddy is touching (or is connected to) fourteen other teddies – but these are what might better be called *teddy volumes* and not just the boundary chords that outline them. In most instances, these boundary chords are actually 'shared' by adjacent volumes and this makes any description that little bit harder.

7.2 Build-units

Within such a scenario, it would be helpful if we could come up with a ***build-unit*** that is able to provide a viable ratio of *WSTs* to *IBCs* and use this as the basis of constructing a lattice of almost infinite size; (infinite in the sense that we are looking for a quantity of whole surviving teddies that correspond to all the protons and neutrons in our universe). We need therefore, to look at combinations of tetrakaidecahedra on a small scale that can be stacked together effectively in order to produce a lattice of near infinite proportions – and this is no easy task. We need to arrive at a situation that results in the spontaneous breakup of the 8D lattice into both independent boundary chords *AND* whole surviving teddies and we require the ability to hypothetically build this from scratch. What has been apparent is that when stacking such *build-units* together, we need to avoid 'doubling-up' the boundary chords as we join these units together or at the very least, arrive at a configuration that minimalises this effect. We also need to isolate what is to become the *whole surviving* teddy and this would seem best achieved by burying it within a surrounding number of *teddy volumes*. The lattice is required to stretch during its evolution and the greater the separation between *WSTs* the better – while at the same time, keeping build-unit-to-build-unit contact to a minimum. This has been tried with several tetrakaidecahedral configurations and out of what became the three finalists; two were rejected because of both a lack of stacked *WST* separation and the fact that an awful lot of boundary chords also became doubled-up in the process (see *Figure 7.2.01* below).

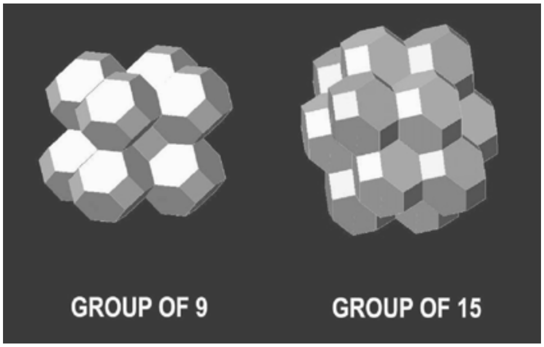

Figure 7.2.01 *Two tetrakaidecahedral 'build-unit' configurations that were rejected because of a lack of adequate WST separation; a frequent 'doubling-up' of boundary chords and a complicated face to face stacking arrangement.*

The first of these produced a 'group of nine' configuration, very reminiscent of what is known as a ***body centred cubic lattice***; which just happens to be one of the basic crystal forms. This was the first choice because of its simplicity, but it produces a complicated stacking arrangement and *WST* boundary chords that are shared with teddy volumes from another *build-unit*. The group of fifteen also shown in the above figure, compounded both the sharing of chords and this face to face stacking arrangement. What seemed to be the out and out winner was the third of these configurations. This incorporated the 'group of fifteen's ability to use all fourteen of the *WSTs* faces and, with the addition of a further twelve teddy volumes both minimized the doubling up of boundary chords and provided a simple face to face stacking arrangement (see *Figure 7.2.02* below).

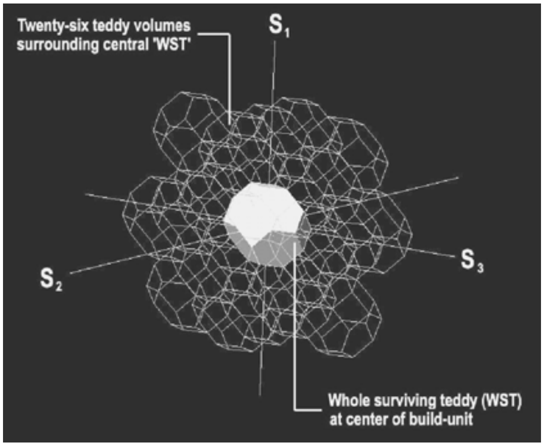

Figure 7.2.02 *A grouping of twenty-seven teddies seems the best way to minimalise the problems with stacking, the 'doubling-up' of boundary chords and WST separation.*

No matter what arrangement is used when attempting to stack *build-units*, you always end up being one step ahead of yourself. The illustration above represents the optimal unit configuration around what is to be a *whole surviving teddy*. There is but a single *WST* (with its thirty-six locked-in boundary chords) and a total of 576 *independent boundary chords* that surround it – but only *HALF* this number is required for the stacking process. If for example, we decided to use either of the faces that are normal to the 'S1' axis, we could hypothetically slice the build-unit through either the 'S2'; or the 'S3' axis; effectively dividing the number of *IBCs* by two (while keeping the central *WST* intact). This gives us an overall teddy volume of fourteen (one for each of its faces) and a stack quantity of 288 resulting independent boundary chords. We could of course, choose any one of the 'S' axes shown in the illustration.

This now provides a ratio of 8:1 for individual boundary chords (8); to those locked into tetrakaidecahedral form within whole surviving teddies (1). Both types of chord will break free from their supporting 8D lattice and *ping* into what would become our own 3D universe, because they are the product of their *tri-planar coordinate* condensation. This can be thought of as being more or less equivalent to the x, y, and z-axes that we can define as being the qualification of three-dimensional form. Or put another way, the *tri-planar coordinate* defines the three degrees of freedom that actually make us three-dimensional. There will effectively be ***eight*** times as many independent boundary chords by mass as whole surviving teddies; although they would have taken up something like thirteen times the teddy's volume while in the 8D lattice. This difference in mass values will prove to be very significant for the universe we observe as a whole today.

Having lost *THREE* of its eight dimensions in the *big-ping*, this 8D level will be left with just five and this will cause a problem. Not only will three dimensions themselves be lost, but their dimensional energy will also be carried down to this new level. This remaining 'ghost' lattice in the eighth (now devoid of boundary chords and teddies alike); will need to find a new position that corresponds with *ITS* (now) lowered 5D energy level and it *MUST* vacate its previous 8D position too. The membrane material, from which it was originally made, will be even more depleted and rarefied, now that the boundary chords have condensed out of it. They are of course, no longer there, but this (remnant) level will retain at least a proportional amount of momentum and this will be the compressional or *contractive* effect it would have experienced during the *big-snap*. Coincidentally, when this remnant 8D energy (now 5D energy) drops to find its new position on the dimensional ladder of hierarchy, it must sit above (or adjacent to), the fourth-dimensional expansive level, because it now has just *FIVE* dimensions of its own. It will have become the exact opposite, with a ***compressional momentum*** that is able to balance the expansive nature exhibited by the fourth.

Lower down the ladder in the newly formed third dimension (which is actually a conglomeration of three-dimensional components rather than a dimensional plane of its own); independent boundary chords and whole surviving teddies have appeared with a particle separation corresponding to that of the *big-snap*. It should be remembered that 'time' is not included here, although 'scale' *WILL* be part and parcel of 3D existence, because it will be buoyed and supported by the existing fourth-dimension.

7.3 The extent of the big-ping

Estimates for the overall size of this embryonic 3D universe cannot be made with any certainty, as there are still and will probably always continue to be too many unknown quantities. However, by considering the proposed structure of the 8D lattice; current estimates of the ***baryon number*** and the possible maximum (assumptive) teddy size at the moment of the big-ping; it *IS* possible to gauge a very rough size for this, the first stage of our three-dimensional existence; if only for the purposes of illustration. The *baryon number* can be considered here as an estimation of the total number of protons and neutrons thought to exist in the observable universe and this is by no means a fixed quantity. I have found two conflicting values for this number already; one[1] in the region of $\mathbf{10^{78}}$ and another[2], which is one hundred times greater at $\mathbf{10^{80}}$. For the purposes of this coming exercise, I will use the latter.

This quantity could also broadly be used to represent the total number of *whole* tetrakaidecahedra that survived intact after they pinged into what was to become our part of the universe. Thirteen times as many *teddy volumes* as this *didn't* however, make it here in one piece, but in order to try and arrive at a conservative figure for the overall number of condensed-out boundary chord tetrakaidecahedra suspended in the 8D lattice *PRIOR* to the big-snap, we will add just the mass difference - or *eight* times the *WST* quantity to the baryon number which is itself, only hypothetical. This conservative approach will provide an estimated original overall 8D baryon count of something like $\boldsymbol{9.0 \times 10^{80}}$.

As this model will also assume an initial condensed-out minimum teddy size roughly comparable to that of the hydrogen nucleus (or a proton or neutron) - this will allow a *pre-stretched* teddy volume of *circa* $\boldsymbol{2.14 \times 10^{-39}\ cm^3}$. As the whole surviving teddy represents the proton in this model anyway, this is not really too much of an assumption. Multiplied by the overall baryon count mentioned above, this will give an estimated volume for the 8D lattice; prior to stretching and the onset of the inevitable big-snap, of $\boldsymbol{c.\ 1.92 \times 10^{42}\ cm^3}$ and this in turn equates to a radius of around $\boldsymbol{7.72 \times 10^{13}\ cm}$ - or *circa* ***772 million kilometres***. Visualised at the same scale as our Solar System, this would seem to give the embryonic eight dimensional pre-stretched universe a radius that more or less coincides with the mean orbit of Jupiter, (see *Figure 7.3.01* below).

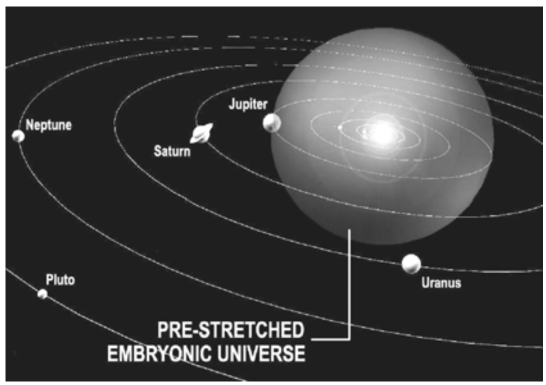

Figure 7.3.01 *A possible estimated size of the 8D embryonic universe after the condensing out of three-dimensional boundary chords, prior to their stretching and inevitable 'big-snap' (not to scale).*

As this net-like lattice of condensed-out boundary chords continued to expand due to the influence of fourth-dimensional scale; it will be assumed that at this stage, each tetrakaidecahedral member of this lattice (although all joined together), will increase their volume in-step with 4D scalar expansion, eventually attaining a radius comparable to that of hydrogen's single electron orbit when in its ground state. Again, based on the baryon number quoted above, this will allow the eighth-dimensional lattice to stretch and attain a radius of something like *c.* ***4.82 x 10^18 cm*** which in more recognisable terms; means that the radius of such a body would have expanded to the equivalent of just over ***five light years*** at the moment of the *big-snap* and the *big-ping* that followed it. The size of our own 3D part of this embryonic universe, now with all its baryonic and fermionic material made from the dimensional boundary chords that would ultimately form the galaxies, the stars, the planets and eventually us would in this scenario, have therefore attained an overall diameter only a light year or so greater than the distance from our Sun, to the brightest star in our night sky, namely Sirius, the 'Dog-Star'.

7.4 A change in environment

This embryonic universe would not only have been extremely small by current standards, but extremely energetic, as boundary chords and teddies alike, inherited energy and momentum from the big-snap itself. Collisions in this early cosmos would have been commonplace and this would have almost immediately prompted the next stage in the evolutionary process of the now *independent dimensional boundary chords* and the *whole surviving teddies*. The energy of the big-snap; that of the big-ping *AND* the energy release from constant boundary chord to boundary chord and teddy-to-teddy collisions, would also produce a great deal of heat.

This crowded early 3D cosmos, perhaps only a little over ten light years across, would be full of fast moving independent dimensional boundary chords and whole surviving teddies – in essence, the same mass as we calculate for our universe today. This is a tremendous amount of material in such a (relatively) small space and the incidence of collision, coupled with the inherent energy carried over from the eighth-dimension, would probably produce temperatures and pressures that may have been almost comparable to those believed to exist within the core of stars today. Suffice to say, that interactions between both teddies and independent boundary chords, would now be within an environment that may also have promoted an early form of nucleo-synthesis and this will be explored in due course.

As far as the boundary chords are concerned, such elevated temperatures would probably be linked to string vibration within their structure and this in turn, would produce an elevation in their energy levels. Some of this would have been radiated as heat, while a proportional amount would be emitted as *higher* wave energy - all of which in this model, would be in the form of dimensional boundary surface waves or *dim-waves* (see the previous chapter). This would provide both the emphasis for the further evolution of our 3D universe *and* a catalyst for a reconfiguration of the whole, surviving teddies themselves. First of all though, the change of environment between the original 8D lattice and the teddies' new lower 3D/4D home should be examined in a little more detail.

Considering the possibility that the original 8D teddy-lattice would be made up entirely from tetrakaidecahedral cells, in which each and every teddy cell was connected to and supported by its neighbours and visa-versa, it would be pretty rigid or almost crystalline. The logical response to what these objects would look like as one tries to visualise these newly pinged-in whole surviving teddies, would be as almost singularly isolated, solitary tetrakaidecahedra in their own right; floating around in what has now become our own space (see *Figure 7.4.01* on the following page). However, this exclusively *EIGHT*-dimensional configuration would not have lasted very long in our 3D world for *TWO* important reasons. Firstly, the whole surviving teddies would no longer be supported within the overall structure of the tetrakaidecahedral lattice as they *pinged* into 3D space individually (their teddy lattice broke-up in the big-snap). It would have been this configuration, comprising countless inter-connected tetrakaidecahedra up in the eighth-dimension, that would have given them form and stability in the first place.

Now in 3D/4D space, their mutual rigidity would have disappeared as they experienced the big-ping and their shapes would shift and shimmer like soap bubbles as they tried to strive for equilibrium in this different environment. Secondly, there would be a great deal of heat which would be the result of vibration in the boundary chords, the excess of which would be dissipated as *dimensional boundary surface waves* (or *dim-waves*). These vibrations or resonances – may have in turn, created a somewhat looser bond between 'HSH' string components and this may have assisted in what was to happen next. There would also be a lot of inertia carried over from the initial big-snap, mainly in the form of spin; some of which, may have been translated into what can be called ***face-spin bias***.

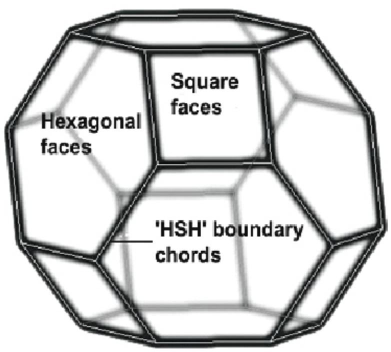

Figure 7.4.01 *Whole surviving teddies ping into our 3D universe along with the independent boundary chords. The teddies each comprise a total of 36No. locked-in, originally HSH configured boundary chords.*

It should be remembered that these objects are comprised solely of *dimensional boundary chords* and these are the product of a condensation of secondary energies that began to reduce at the *tri-planar coordinates* within the original 8D lattice. The *whole surviving teddies* have been described as containing a total of thirty-six of these boundary chords, but this is actually a little misleading. They should be considered as containing a total of thirty-six ***dimensional boundary chord volumes*** *(V^{dbc})*, as in reality, there are no real physical distinctions between one chord and the next within the body of the teddy. They are if you like, 'all in one piece'. The closest analogy to this, is to try and imagine the teddies as a little like 'dye-cast' lead soldiers that once removed from their mould, appear to include separate musket, lance and other military regalia although they are in reality, just a single metal casting.

It was stated in Chapter Five of this submission, that the boundary chords would be made up from the condensed-out string components of two hexagonal and a single square secondary membrane energy (within the 8D lattice) and this *dimensional boundary chord volume* ($\mathbf{V}^{dbc}$) would therefore be equivalent to:

$$\boldsymbol{V^{dbc} = HSH},$$

which provides a three-dimensional value for the combination of single-value 8D boundary strings that condense at this *tri-planar coordinate*. This 3D value requires referencing to the scale of processes that we know to occur within our world and this can be tackled in one of two ways. There is unfortunately, no way of calculating for sure, what the scale of the 8D lattice is (or was) at the time of the big-snap – even though the currently held baryon number does go some way in helping us to visualise this. One solution would be to try different permutations of scale on what would basically be a *trial and error* basis - but with so many variables available to us (especially within such an early development stage of this model); this is not a very satisfactory method of trying to achieve such a result. Instead, we could look at what the 3D results of the big-snap and the big-ping may have produced in terms of measurable phenomena here in our neck of the woods. In other words, what are the scale of processes that would match those of the teddies, once they have actually appeared in our world and can one work backwards from here?

At the atomic level in our three-dimensional universe, it could be argued that we can recognise *TWO* different scales that relate to size (*10^{-08} cm* for the electron shell and *10^{-14} cm* for the nucleus) and another, somewhat more subtle relationship for mass (*10^{-31} kg* for the electron mass and *10^{-29} kg* for the nucleon's components). The mass is more of interest here because it was postulated earlier, that within the 8D lattice, there was not (as yet) any differentiation between volume, area, mass or density *(VAMP = 1)*; because these are three-dimensional parameters that had not yet evolved.

This would allow the V^{dbc} calculation illustrated above, to translate this ***tri-planar area rule*** (of basically *H x S x H*) into a more usable value. This also means that because there was this lack of differentiation between these (3D) parameters within the confines of this model at the time of the big-snap and the big-ping, this rule of non-differentiation would still hold firm and therefore:

$$V^{dbc} = M^{dbc}$$

where the latter represents the ***dimensional boundary chord mass***.

This may all seem to be a somewhat curious ‘play with numbers’ and the reader may be puzzled by what could also be called the ‘coincidences’ within what is about to come. Perhaps curiously enough, there is also no need to employ long-winded differential equations, or higher mathematical acrobatics with which to argue such a case - simply because they do not appear to be necessary within what is basically a simple, straight-forward model. It has already been stated in an earlier chapter, that any *real* solution to the puzzle that is our universe, may be based on very simple truths; which may include nothing more intricate than the beauty of simple geometry. This all boils down to a matter of *simplicity* and in this model at least, this will involve *only* those perfectly simple arithmetic functions of addition, subtraction, division and multiplication. Such an *underlying* simplicity is *ALL* that is required to understand how the dimensional boundary chords work – both in their origin, their subsequent evolution *AND* in the way they perform here, in our own now differentiated 3D/4D world.

The *dimensional boundary chord volume* (which is in itself, a very simple arithmetic concept); has already been given its own value in a previous chapter and this was equivalent to ***0.04687***; originally derived as it was, from the area calculation that was derived from its hexagonal and square membrane components or percentages thereof (where the boundary chord value could be said to be equivalent to *‘HSH’* or *0.4330 x 0.2500 x 0.4330*).

The stretching of the 8D lattice (because of continued 4D expansion) had to ultimately come to an end with what has affectionately been dubbed the big-snap, when independent dimensional boundary chords and whole surviving teddies all broke free from the lattice from which they were born, when they had achieved a size comparable (in this model) to that of the atom, or *circa* 10^{-08} ***cm***. This would give the boundary chords themselves a length of around 10^{-09} ***cm*** and at the instant of the big-snap, this value would be imprinted on these components as they pinged into the supporting fourth-dimensional environment; while at the same time, undergoing an ***elastic rebound*** as a result of their period of stretching within an eighth-dimension setting.

Although it could be argued that these statements are still more than just somewhat assumptive at this stage, this procedure of attempting to make a firm reference to processes a little closer to home does however, allow the area calculation mentioned previously, to produce a more realistic *‘HSH’* value – and this will consequently allow us the opportunity to refine the dimensional boundary chord values shown on the previous pages to 0.4330×10^{-09} for the ‘H’ component and 0.2500×10^{-09} for the ‘S’ and therefore overall:

$$(4.330 \times 10^{-10}) \times (2.500 \times 10^{-10}) \times (4.330 \times 10^{-10})$$

$$= 4.687 \times 10^{-29}$$

and this conversion has been incorporated into what was originally presented as *Figure 5.4.02* in Chapter Five – but now revised and included as *Figure 7.4.02* on the following page.

As the *dimensional boundary chord volume* (V^{dbc}) will be equal to the *dimensional boundary chord mass* (M^{dbc}) because of our *VAMP=1* statement within the original 8D lattice from whence it came; this important relationship can now be expanded upon and expressed as:

$$M^{dbc} = 4.687 \times 10^{-29} kg$$

Independent boundary chords will break free from their 8D lattice and ping into our own three and four-dimensional part of the universe, with a mass therefore equivalent to 4.687×10^{-29} *kg*.

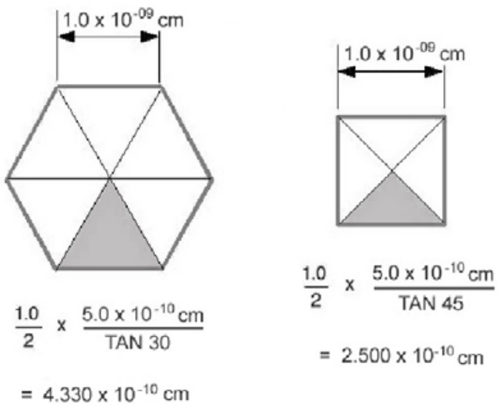

Figure 7.4.02 *The boundary chords will arrive in 3D/4D space with an imprinted dimensional boundary chord value derived from their 8D lattice size, immediately prior to the big-snap.*

The whole surviving teddies on the other hand, will each comprise a total mass that will be equivalent to *thirty-six times* this individual dimensional boundary chord value, or:

$36 \times 4.687 \times 10^{-29}$ *kg*, therefore,

$$36\ M^{dbc} = 1.687 \times 10^{-27} kg$$

As both independent boundary chords and whole surviving teddies *ping* into 3D space, they are now pretty much (complete) quantities in their own right. It should be noted here, that this particular mix of kilograms and centimetres may not be quite what convention dictates, but in this setting, it works quite well.

The new environment in which both whole surviving teddies *and* independent boundary chords now find themselves will however, induce a series of reconfigurations prompted by these surrounding - that in the case of the whole surviving teddy, will involve a further 'split' in the boundary chord material. As will be seen shortly, these *new* string components will be of a slightly *different* value when compared to those of the original tri-planar coordinates. As postulated earlier in this chapter, a combination of environmental effects such as pressure, heat and induced *face-spin bias* will all contribute towards an unavoidable change in the nature of the whole surviving teddies. The independent boundary chords will fair no better and these will be examined in a subsequent chapter.

The newly appeared teddy would have entered our world as a rather unstable object in the first place and *face-spin bias* can be described as the tendency of the boundary chords to exhibit an induced spin centred on and around the hexagonal faces of the teddy (see *Figure 7.4.03* below). This would have been caused initially, by the break-up of the 8D lattice, where independent boundary chords had been forced to separate from the whole surviving tetrakaidecahedra.

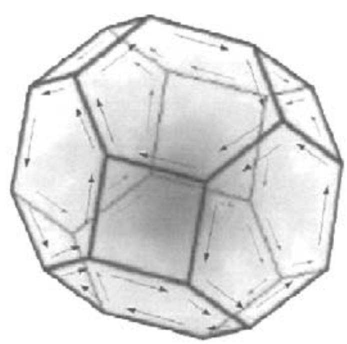

Figure 7.4.03 *A component of 'face-spin bias' will be inherited from the inertia of the big-snap, which will manifest itself as a rotational tendency of the boundary chords that mark the edges of the hexagonal faces. This will create 'spin-conflict' within the body of the teddy.*

This rotational tendency of the teddy's chords will also induce a ***spin conflict*** within the *WST* where two chords meet, as this becomes an area where *double* the volume (or chord mass) is basically trying to fill the space taken up by just a *single* chord volume. Coupled with what has become an un-confined surrounding space and the resultant heat of this embryonic universe; a reconfiguration will occur as this unstable teddy begins to strive for a new equilibrium.

7.5 Stage 1 reconfiguration

This will basically take the form of two distinct stages. The *face-spin bias* will try to push two boundary chord volumes into a single space, which will result in a separation at the ***point of convergence*** *(POC)* where two hexagonal faces meet. These *POCs* are actually the areas where the individual boundary chord volume (or boundary chord mass) is situated and it is here that the chords start to separate first. The individual boundary chord mass must be conserved and this will continue to occur at the *POC*. The overall structure of the teddy will also be conserved (i.e. its fourteen tetrakaidecahedral based surfaces) and this will necessitate the two-way split of the chord material into two series of differently sized, equally valued chord components (see *Figure 7.5.01* below).

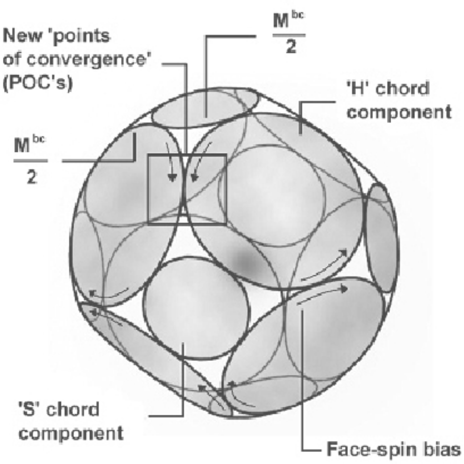

Figure 7.5.01 *With spin conflict and other physical influences playing their part, the original teddy must reconfigure its boundary chords in order to regain its equilibrium.*

This has the effect of altering the teddy's *POCs* so that they are now points where *TWO* chord components come together to produce the original dimensional boundary chord value (and thus mass) and allow unhindered rotation of chord components, centred around the hexagonal faces. The new, previously square faces will not (at this stage) exhibit *face-spin bias* because they are trapped between contra-rotating areas bounded by four (previously hexagonally shaped) circular chords.

The second significant event in the reconfiguration of the teddy is that dimensional energies will have changed. The original boundary chords were all of the same three-dimensional mass equivalence and therefore three-dimensional energy and this produced the teddy's overall mass signature of 1.687×10^{-27} *kg* shown on page 52. A dimensional boundary chord mass is *still* produced by the teddy's *POCs*, but there is a subtle difference because of the resultant split within these chords. Each original boundary chord *POC* was of the same finite length (with thirty-six in total) and each of these produced a mass component equivalent to 4.687×10^{-29} *kg*. The *POCs* configuration has changed however and can now be considered as comprising *TWO* different chord components that must combine to conserve this same dimensional boundary chord value.

Therefore, each of these new chord components must contribute half of the original dimensional boundary chord mass or 2.343×10^{-29} *kg*. This new configuration will also provide a solution to the spin conflict at these *POCs*. At each side of these convergent areas, the new circular chord components arc away from the *POCs*, which seems to suggest that the interaction that produces the dimensional boundary chord mass, does not involve *ALL* the finite boundary chord length of the original teddy, (refer to *Figure 7.5.02* illustrated on the following page).

This may at first sight, appear to be a minor geometric detail, (tiny when one considers the scale of these things); but these are areas of *half-chord* interactions and therefore each must have *circa HALF* the energy level – as opposed to the full 3D energy level at the exact 'point of convergence'. These subtle differences will need to be explained in the context of this model, before proceeding any further.

The concept of dimensional energy was introduced in Chapter Two and is simply the principle of applying different energy levels to differing complexities of dimensional form. It was also surmised that the relationship between first second and third-dimensional energy levels would follow a simple rule of increasing magnitude in the form 10^1, 10^2 and 10^3 etc., as one climbs up the dimensional ladder of hierarchy.

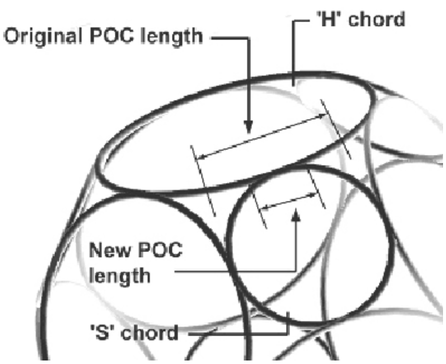

Figure 7.5.02 *The apparent difference in POC length between the original and reconfigured teddy could produce a difference in apparent mass.*

The configuration of the (new) 'points of convergence' may not transfer the same amount of three-dimensional energy to the environment as those of the original teddy configuration and this may cause a perceived mass difference between the two; (this will all be dealt with in much greater detail within a later chapter). Mass or inertia will therefore, be relative in our world and considering the fact that we and our instruments are three-dimensional in nature anyway, the perceived results of any such measurements we make can only (at this moment in time at least), be three-dimensional in nature. This is not to say that any missing mass is not there – we may simply be unable to detect it at present. For example, if the cube pictured in *Figure 2.3.01* in Chapter Two is allowed to represent an overall mass comparable to that of the dimensional boundary chord (M^{dbc}) or 4.687×10^{-29} kg, its two-dimensional equivalent could be said to equate to:

$$\frac{M^{dbc}}{2D} = \frac{4.687 \times 10^{-29}}{10^2} = \mathbf{4.687 \times 10^{-31}\ kg}$$

This would produce a new mass value of 4.687×10^{-29} minus (-) 4.687×10^{-31} or 4.640×10^{-29}, but this does not infer missing mass at all, it merely misses a three-dimensional interaction that makes it so. This idea will be explored more fully in Chapter Nine of this submission, when interactions occurring within the nucleus itself are looked at in much more detail.

Making up the greatest percentage of these new three-dimensional objects by far, are the *independent dimensional boundary chords* that resulted from the break-up of the majority of tetrakaidecahedral cells during the big-snap. These are the teddies that *DIDN'T* make it 'whole' as they appeared into 3D/4D space. There would be eight times as many boundary chords by mass, as there were equivalent 'locked-in' versions, contained in the *whole surviving teddies* and these too, would appear in our 3D/4D space at exactly the same time. Unlike the reconfigured teddies however, the independent boundary chords can be considered as ready-made, isolated chords in their own right.

Originating from the same three boundary strings, (just like those of the original teddy), they will exhibit the same original values thus:

$$4.330 \times 10^{-10}\ (H) \times 2.500 \times 10^{-10}\ (S) \times 4.330 \times 10^{-10}\ (H)$$

$$= \mathbf{4.687 \times 10^{-29}\ kg}$$

Although these bodies comprise the same material as the teddies, their geometry is very basic and now being solitary single-chord entities, they will retain this original value for the time being at least. Their mass in our world will be just a thirty-sixth that of the teddies' and they *will not* display any face-spin bias because they are not subject to the tidal-like forces that existed within the body of the original whole surviving tetrakaidecahedron. They will therefore, be devoid of any corresponding charge (and this concept will be dealt with in a later chapter). In the early 3D universe however, they will still undergo collision and change and this will ultimately result in a collection of independent dimensional boundary chords that may exhibit different (but intimately related) characteristics. They will take a slightly different evolutionary path towards reconfiguration, primarily because of their different physical appearance.

The independent dimensional boundary chords (or *IBCs*), can be considered as chords with open, or loose ends, whereas those of the teddies become closed, circular varieties. *IBCs* will be described more fully in Chapter Ten of this submission.

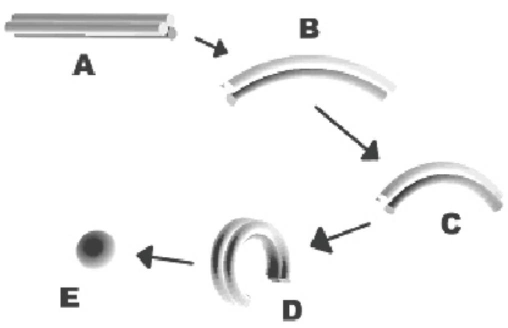

Figure 7.5.03 *If independent boundary chords (A) gain 'spin' they may curl-up (B-D) into tight balls or particles (E). Although shown as three strings in the figure, they would probably resemble singular rods.*

Without connections to other boundary chords, (like those that make up the original whole surviving teddies), these loose-ended animals will more or less resemble tiny rod-like structures when they *ping* into our 3D/4D environment (rather like the confectioner's 'hundreds and thousands' used in cake decoration). Interactions with each other – or indeed with other phenomena may however, endow them with their own 'spin', which under certain conditions, may encourage them to curl up into tight balls or particles (see *Figure 7.5.03* above).

The nature of the 8D lattice and the way in which the tetrakaidecahedra can stack together with no resultant 'free' space between them, dictates the ratio of teddies to boundary chords that enter 3D/4D space. Taken as a relationship, the total number of whole, surviving teddies that manifest themselves into our world after separating from the 8D lattice during the big-snap, can be called *ONE*; while the total number of independent boundary chords (not including the teddies) will equate to *EIGHT*. Taken as a whole though (or *8 + 1 = 9*), the strings from which both *IBC's* and teddies were originally made – will be *three-times* this number (there are three strings to each original boundary chord), or a total of *TWENTY-SEVEN*.

These strings are descended from the original planar surfaces that formed in the four-dimensional *vacuum collapse* and can be used to represent this four-dimensional quantity in our world. As the teddies and independent boundary chords dropped from the eighth-dimensional level to their new three-dimensional position, they would actually be suspended *within* this higher dimensional plane. Therefore, taking these strings as being representative of the *numerical* quantity of 4D space, one is therefore presented with a ratio of ***1 : 8 : 27*** (locked-in boundary chords; to independent boundary chords; to single strings or string energies).

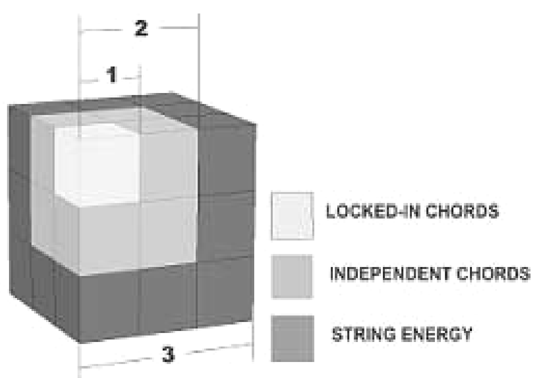

Figure 7.5.04 *Volumetric ratio of locked-in boundary chords (whole surviving teddies); independent boundary chords; and total string energy composition.*

This has revealed one or two interesting possibilities and in order to show the significance of what this ratio may be able to represent, it has been visualised here in graphic (or volumetric) form within *Figure 7.5.04* on the previous page.

The illustration reveals two characteristics that could be important to the working of this model. Firstly, (and perhaps not surprisingly), there appears to be a definitive relationship between all three components and the *cubed root* of their arithmetic values (i.e. *1 : 8 : 27*) can be represented by the 'perfect' ratio of ***1 : 2 : 3***. Secondly, each value can be expressed as a percentage of the whole, and this becomes:

Locked-in chords	2.78%
Individual chords	22.22%
String energy	75.00%

The chords ‘locked-in’ to the *whole surviving teddies* would represent the major constituents of matter within our cosmos (i.e. the protons and neutrons), while the *independent boundary chords* can in this model, be defined as the more ethereal components we seldom observe, including the origin of what will be termed the (passive) photon and perhaps the different varieties of neutrino and others - but more about these particular animals in due course. The *independent boundary chords* can also account for what is commonly referred to as the elusive ***dark matter***, currently believed to make-up the bulk of the so-called *missing* mass within the universe.

String energy on the other hand, is much more subtle and is an inferred quantity, representing as it does, the original lattice material (its hexagonal and square membranes), in which we – as the third-dimension, are suspended. This would seem to closely coincide with the believed definition of ***dark energy***, which is currently thought to be responsible for the observed expansion of the universe and this would also be an appropriate definition within this model too.

At the (original) time of writing, the quoted figures in the press (*New Scientist* 16th February 2004)[3], for the percentages of *ordinary matter; dark matter* and *dark energy* observed within the bounds of our own galaxy, stands at 3%; 24% and 73% respectively and these (published) figures are quite close to the percentages arrived at for the *locked-in chords*; *independent boundary chords* and *total string energies* described here. They are sufficiently different however, to suggest what could actually be the result of both 'observational error' and a change in this ratio over time, due to later interactions and environmental conditions.

The universe we actually witness around us would seem to be just a small part of a larger multi-dimensional unit whose processes and interactions has led to our own 3D existence and the material from which we are made. This has been an evolutionary process that created three-dimensional boundary chords and teddies, as a by-product of events that occurred within an 8D setting. The eight-dimensional lattice, from which we originally came, would not have been far out in the depths of the cosmos, beyond the reach of even our most powerful telescopes, but instead it would have been all around us, separated *simply* by a difference in the perceived energy levels that drove it. We would be a less energetic, cooler condensation of this higher dimensional energy plane that would now be just a ghost of its former self; far beyond our current reach (in dimensional energy level terms of course).

Our own evolutionary processes would start with the reconfiguration of the original 8D lattice, as boundary chords cooled and differentiated out of the hex and square secondary membrane energies in what were perhaps a series of *membrane rupture events* that were pondered over within an earlier chapter. This material would have been carried over from the expansive fourth-dimension as scalar boundaries made contact with neighbours, producing an 8D reaction. As our material dropped because of its dimensional energy signature, it became buoyed within the slightly higher energy level that is fourth-dimensional scalar expansion; just as water droplets condense out of steam. These tetrakaidecahedral bodies (or teddies) would thus begin their own evolutionary processes, as they became the early protons and neutrons in our combined 3D/4D universe. Together with the ever-present component of time, which may itself be more of a ‘single-dimensional’ concept; they would interact with others of their ilk to create by chance, the familiar universe we see around us today. This evolutionary process would lead to the first of the recognisable elements; the formation of the first stars and the ultimate conglomeration of the more complex molecules that have ultimately led to life. It would involve processes that obey a simple set of arithmetic and geometric rules and these would govern the interactions between proton-to-proton and molecule-to-molecule. These interactions are discussed more fully in later chapters of this submission, but it may be prudent to turn to the fourth-dimension itself and, with these new (but still somewhat assumptive) insights, delve a little further into the nature that is the expanding universe around us; one that in this model can only be fuelled by its integral component of ‘scale’.